scientific and technical meetings. The committee would not include outside academics. "We want to be sure that the US taxpayer benefits from this research and that the Soviet Union doesn't", says one official.

The academic community has been predictably alarmed by the incident. Officials of the Association of American Universities, the National Association of State Universities and Land Grant Colleges and the American Council on Education raised the matter at a meeting on 1 September

with Under-Secretary of State Richard D. De Lauer, the Pentagon's chief scientist. The Defense Science Board, which advises De Lauer, has made a series of studies on which scientific information should be withheld and has helped to compile the militarily critical technologies list, which is considered so sensitive that even the list of headings remains classified. Thus, so far, scientists and engineers have no idea what subjects the Department of Defense considers too sensitive for presentation in public.

Deborah Shapley

Keyworth on fusion

US seeks more foreign links

Washington

The Reagan Administration's alarm about the outflow of scientific information from the United States seems not to have interfered with its little-noticed plan to promote international cooperation in fusion. The architect of the policy is George A. Keyworth III, the presidential science adviser, who says that the next generation of fusion devices should be jointly agreed by the United States, the European Community and Japan, perhaps even jointly funded and operated by them.

Fusion advocates in Congress think the strategy too risky, citing the strains that might arise if construction of the \$1,000 million-dollar devices become subject to other strains among the allies. Another problem is whether the Administration would agree to the participation of the Soviet Union. The Soviet Union has an advanced fusion programme and a long history of cooperation with US fusion scientists. But President Reagan has been allowing bilateral science agreements with the Soviet Union to expire, and the agreement which covers fusion cooperation is due to end next March.

The White House's logic was explained recently by John Marcum, assistant director of Keyworth's office for energy and natural resources. "We are spending nearly half a billion dollars a year on fusion, which is the most challenging project man has ever undertaken including the Moon landing and the Manhattan project", says Marcum. "Yet we don't expect fusion to generate significant quantities of commercial electricity until the middle of the next century. Devices will cost in the billion dollar range and several different prototypes will have to be built before we find the one that is most practical."

"Let's face it, the United States, Japan and Europe can't afford independently to build their own tokamaks, stellerators and tandem mirror devices."

The JT-60 tokamak being built in Japan is now the most expensive fusion device under construction; it will cost an estimated \$1,000 million. The Joint European Torus (JET) that the European Community is building at Culham in the

United Kingdom will cost approximately \$500 million. The largest US device under construction is the TFTR at Princeton University, which will cost approximately \$300 million. Another device, the long-pulse length Torsupra being built by France, will also be expensive. Keyworth and others in the fusion community argue that by the time the next generation comes to be designed the costs will be too great for any single country to bear.

Keyworth has reportedly visited the most advanced example of US cooperation in fusion research, the US-Japanese Doublet III, built by the General Atomic Company in San Diego, California, and funded and operated on a 50:50 basis. The United States also participated with the EEC, Japan and the Soviet Union in an International Atomic Energy Agency design workshop known as INTOR (for International Tokamak Reactor).

As a result of the Versailles summit meeting in June, Keyworth has a chance to make his influence felt. He is the President's representative to the summit working group on cooperation in science and technology, and fusion is one area the group is studying.

The Department of Energy (DoE), which runs the US fusion programme, is following the Keyworth policy. Last week,

fusion programme officials met representatives of three foreign programmes in Washington: Donato Palumbo, the director of the EEC's fusion programme; S. Mori, a director of the Japanese Atomic Energy Research Institute; and R.S. Pease, programme director of the UK Atomic Energy Authority fusion programme. The purpose was to "look for areas of mutual technical interest" according to Mike Roberts of DoE. The foreign fusion officials also met officials of the White House, since they were in Battimore attending a world fusion conference.

But Congresswoman Marilyn Lloyd Bouquard (Democrat, Tennessee), who hosted a workshop last week where international fusion scientists met congressmen and their staffs, is sceptical of Keyworth's enthusiasm for international cooperation on future devices. One of her staff pointed out that it took two years of negotiations to get US-Japanese agreement on the Rotating Target Neutron Source machine at Lawrence Livermore Laboratory. "If you don't want to spend money, it's nice to throw this idea out", he went on. "On the other hand, there's more to international cooperation than good intentions. When we have some friction with our allies over steel or the pipeline, its going to be tough to go on building billion dollar machines."

It is not yet clear whether the Soviet Union would be deliberately excluded from future planning to decide which country builds a stellerator, or a mirror, or a tokamak. Keyworth's office makes it clear that it wants to enhance cooperation in EEC and Japanese projects, rather than in the International Atomic Energy Agency's joint project which includes the Soviet Union. Although Keyworth has not said publicly that he would exclude the Soviet Union, the Administration's overall denial of advanced technology to that country would make such a policy likely. It remains to be seen what Keyworth's would-be partners in fusion cooperation think on the question of Soviet participation.

Deborah Shapley

University teachers take to the streets

Politicians in Britain are well aware that further cuts in spending on the universities will be met with indifference or approval from the majority of their constituents. That, at least, is the thinking behind a new advertising campaign launched by the Association of University Teachers (AUT) last week. To give added weight to the AUT's political lobbying the association is buying advertising space on buses on London's 88 route, which passes the AUT's headquarters and, as it happens, goes down Whitehall. AUT sees this as a beginning to the process of making the general public more aware of the value of the universities. Further exploits being considered include advertising on London's underground trains and spreading the bus campaign to provincial cities.